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Signed J Evans.

Dated 7 September 2000

APPARATUS AND METHODS OF DETECTING AND CONTROLLING TWISTS IN MULTICORE CABLES

The present invention relates to methods and apparatus for detecting and controlling twists in multicore cables.

Cables used for telecommunication and other high technology applications are required to be manufactured to high specifications since the way in which two or more conductors are twisted together can effect attenuation and crosstalk.

Generally, cables which have two or more conductors twisted together rely on the apparatus generating the twist to ensure that the twisting takes place in a regular and uniform manner. However, in practice, the twist produced will vary and this in turn will vary the attenuation within the conductors and the crosstalk between them.

It is an object of the present invention to provide apparatus and method of measuring the twist in a twisted cable as it is being manufactured so that with the aid of feedback, the twisting action can be modified to reduce non-uniformity towards zero.

According to the present invention, there is provided apparatus for detecting the twist in a multistrand or multicore cable into which a nominal twist per unit length is introduced, the apparatus comprising means for measuring the speed at which the cable

is fed back to the twisting assembly which responds by adjusting the twisting action in a sense to reduce the difference to zero.

Figure 3 shows the detection assembly 10 in more detail. As shown, a light emitter 22, on one side of the cable 4, is directed at a light receiver 24 in the opposite side of the cable. A first lens 26 located between the emitter 22 and the cable produces parallel rays of light, some of which are interrupted by the cable 4. Another lens 28 between the cable 4 and the receiver 24 receives the non-intercepted light and focuses the rays on the receiver 24.

As can be seen as the twist progresses, the amount of light intercepted by the cable will vary and so will the shadow cast by the light on the receiver 24. Hence, the output signal from the receiver will have a frequency component equal to the twist frequency.

The apparatus shown in Figure 4 is arranged to provide a first output indicative of the twist rate of a cable consisting of twin twisted strands or conductors and a second output indicative of the speed of the cable. Both of these parameters can be used in feedback systems to control the production of the cable.

As shown, the twisted cable 36, emerging from a twisting assembly 30, is supported by a downstream roller 32. A light shield 34 extending above the cable 36 is provided with two slots 34A and 34B spaced apart in the longitudinal direction of the cable 36 and extending tangential to the cable.

CLAIMS

1. Apparatus for detecting the twist in a multistrand or multicore cable into which a nominal twist per unit length is introduced, the apparatus comprising means for measuring the speed at which the cable travels and producing a reference signal having a frequency equal to the nominal twist rate of the cable, means for measuring the variation of a transverse dimension of the cable when viewed from a fixed point near which the cable passes to produce an output signal including a frequency component equal to the twist frequency, an analyser for conducting an analysis on the output and conditioned by the reference signal to output only a measurement signal having said twist frequency.

2. Apparatus according to Claim 1, including a comparator for comparing the reference frequency signal and the measurement signal and producing a control signal representative of the frequency difference.

3. Apparatus according to Claim 1 or to Claim 2, wherein said measuring means comprises capacitive means.

4. Apparatus according to Claim 1 or to Claim 2, wherein said measuring means comprises ultrasonic means.

5. Apparatus according to Claim 1 or to Claim 2, wherein said measuring means comprises optical means.

ABSTRACT

APPARATUS AND METHODS OF DETECTING AND CONTROLLING TWISTS IN MULTICORE CABLES

The apparatus includes a transducer (12) coupled to a wheel driven by the cable (4) to indicate the speed of travel of the cable. A calibration unit (18) converts this speed in collaboration with a nominal twist rate set into the unit, into an output signal having a frequency equal to the nominal twist frequency of the cable. A detection assembly (10) downstream of the wheel (6) detects the variations in thickness of the twisted cable as it passes and thus produces a signal having a frequency component directly related to the actual twist rate. An analyser (18) conducts a fourier analysis on the output of the detector and, with the aid of the nominal twist frequency, is able to select the frequency component representative of the actual twist frequency. The actual twist frequency is compared with the nominal twist frequency by a comparator (20) and the resulting difference signal is fed back to the twisting assembly.

(Figure 1)

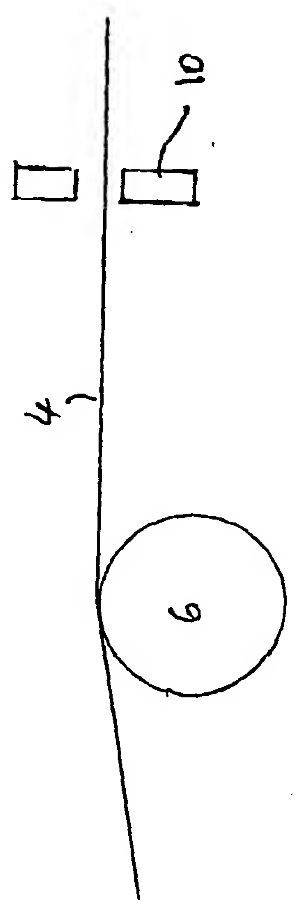

FIG 2

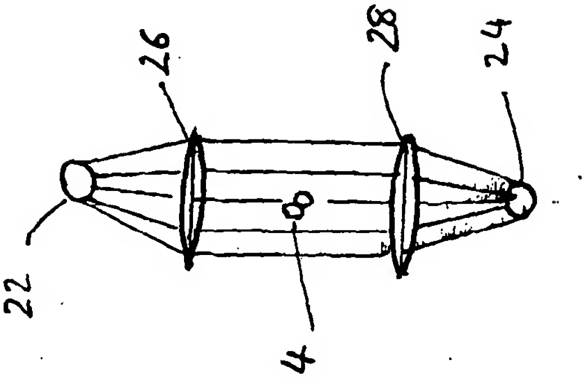

FIG 3